2023 COASTAL MASTER PLAN

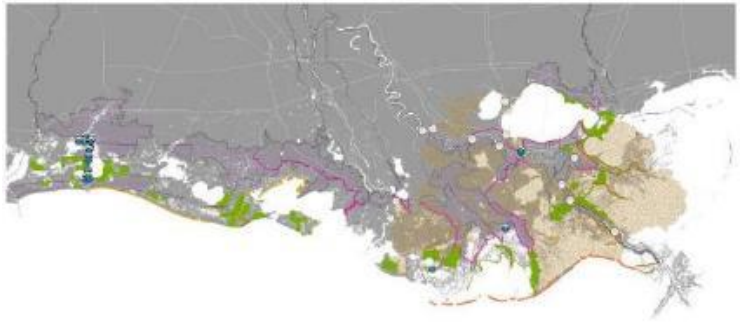
COMMITTED TO OUR COAST

MASTER PLAN PROCESS
and INCORPORATING NEW RESEARCH

Governor's Advisory Commission Meeting | June 10, 2020

WHAT IS THE COASTAL MASTER PLAN?

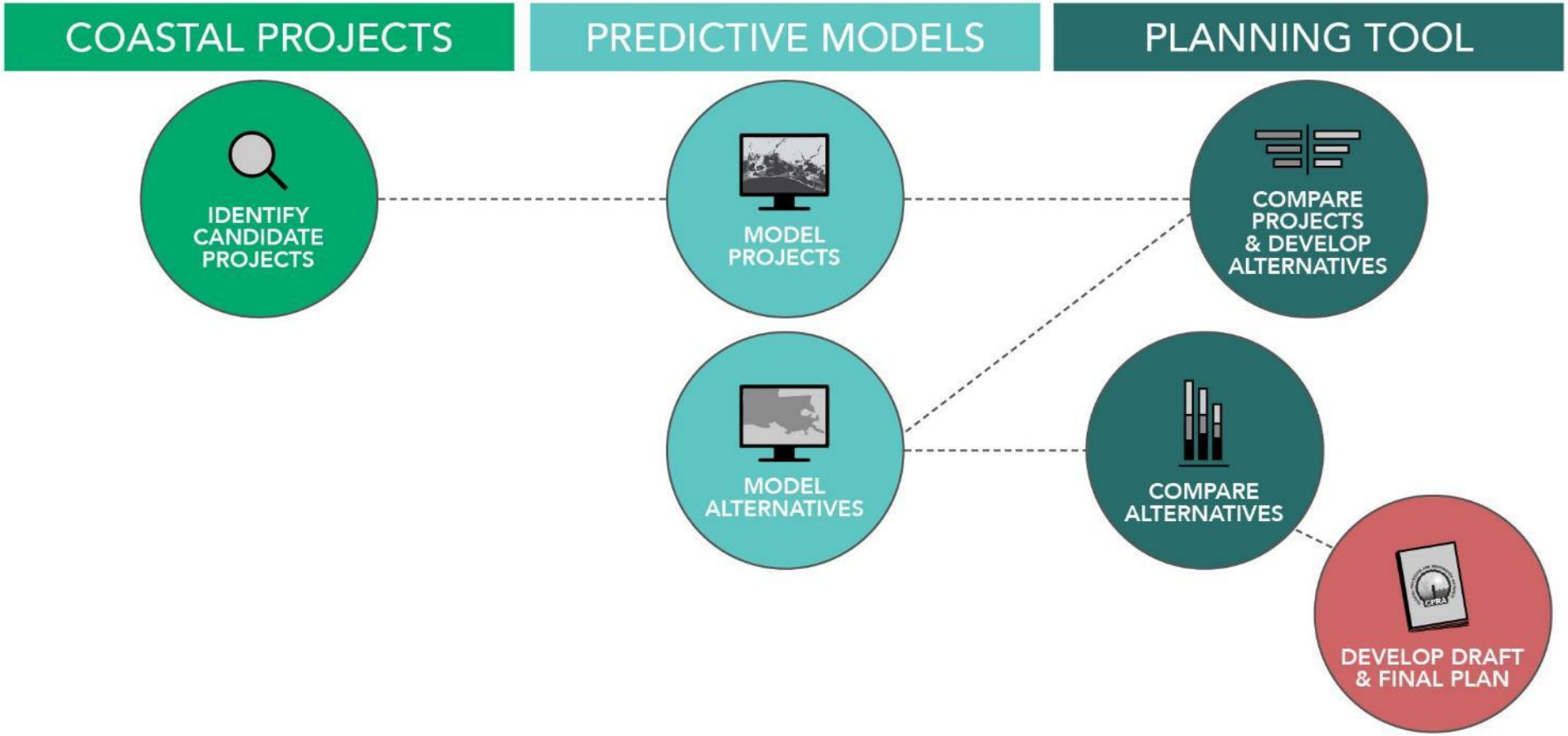
- Prioritization effort. How can the state spend its money most cost-effectively over the next 50 years to reduce storm surge based flood risk and restore and maintain coastal wetlands
- Built on world class science and engineering
- Illustrates how the coast is going to change
- Required by law to be updated every six years
- Incorporates extensive public input and review
- Advances a comprehensive and integrated approach to protection and restoration
- Identifies investments that will pay off, not just for us, but for our children and grandchildren



MASTER PLAN PROCESS

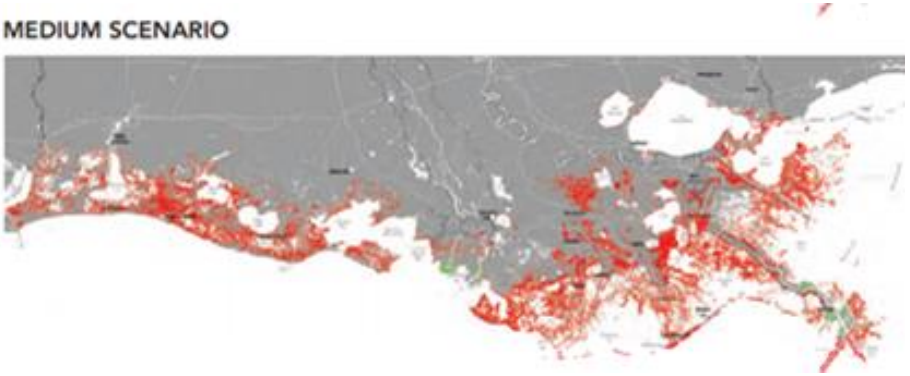
LOUISIANA COASTAL MASTER PLAN

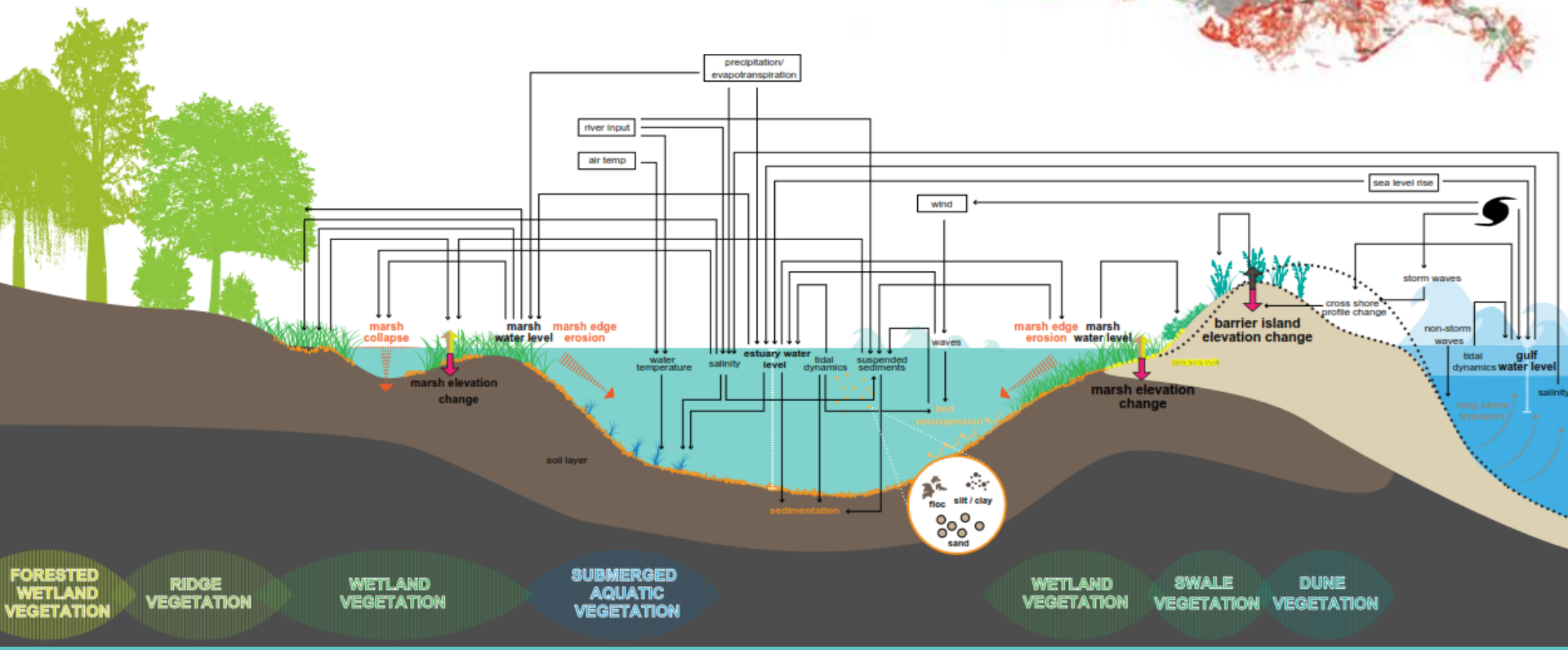
DEVELOPING THE PLAN



COASTAL MASTER PLAN
INTEGRATED COMPARTMENT MODEL

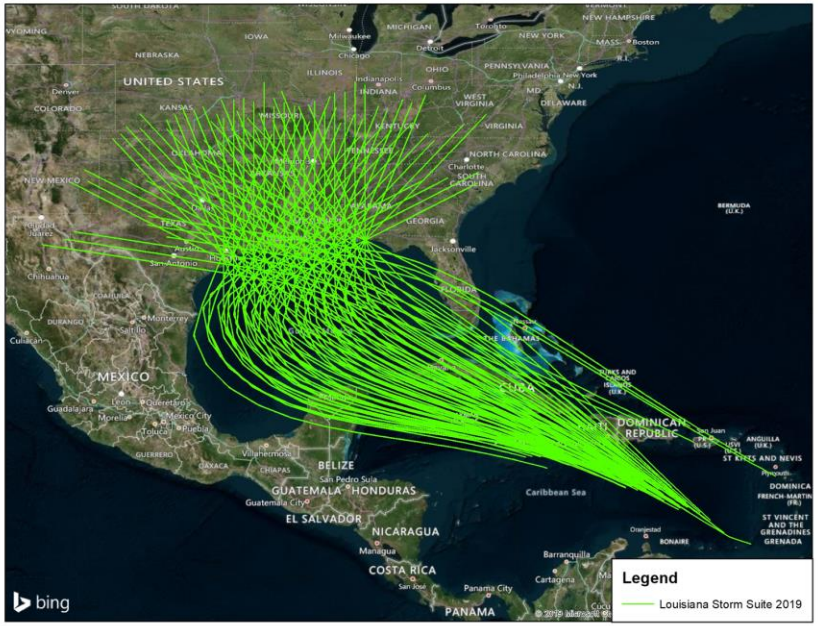
Land Change
Vegetation
Water levels
Salinity
Habitat - HSIs

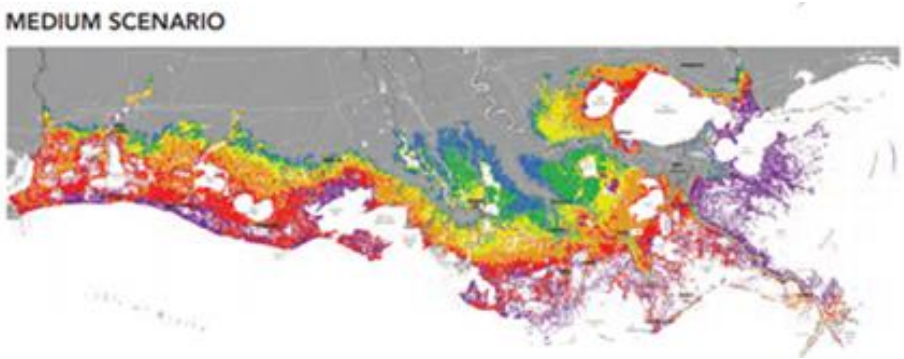




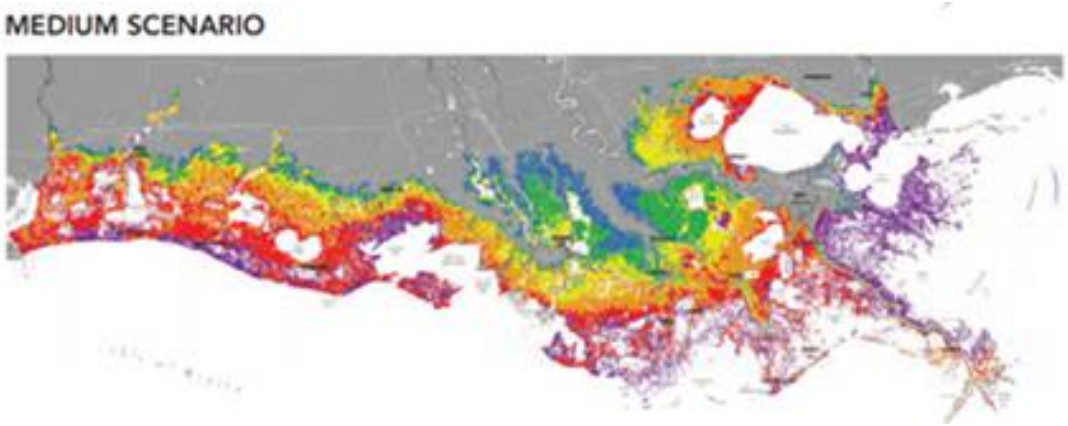
COASTAL MASTER PLAN
SURGE AND WAVE MODELING

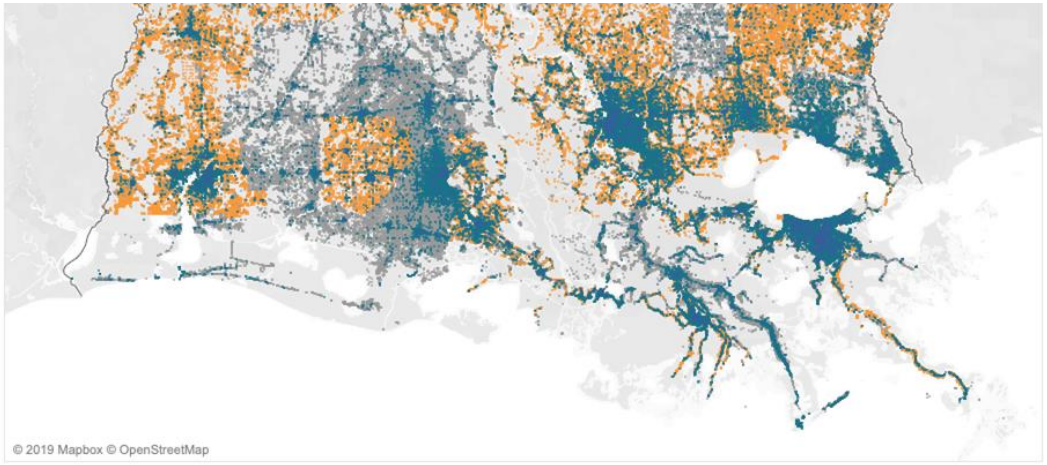
Flood depths associated with storms





COASTAL MASTER PLAN
CLARA - RISK MODEL





BOUNDARY CONDITIONS AND ENVIRONMENTAL SCENARIO VALUES

2017 SCENARIOS

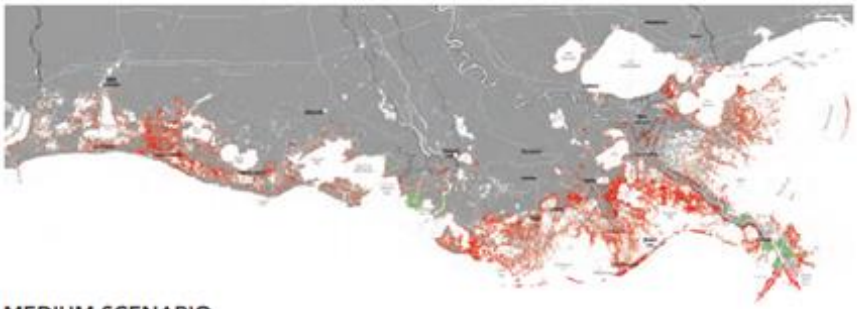
Scenario	Precipitation	ET	ESLR (m/50yr)	Subsidence	Overall Storm Frequency	Average Storm Intensity
	ICM Scenarios				CLARA Scenarios	
Low	>Historical	<Historical	0.43	20% of range	-28%	+10.0%
Medium	>Historical	Historical	0.63	20% of range	-14%	+12.5%
High	Historical	Historical	0.83	50% of range	0%	+15.0%

In the 2017 Master Plan, environmental scenario variables were assigned individually to derive low, medium, and high land loss outcomes.

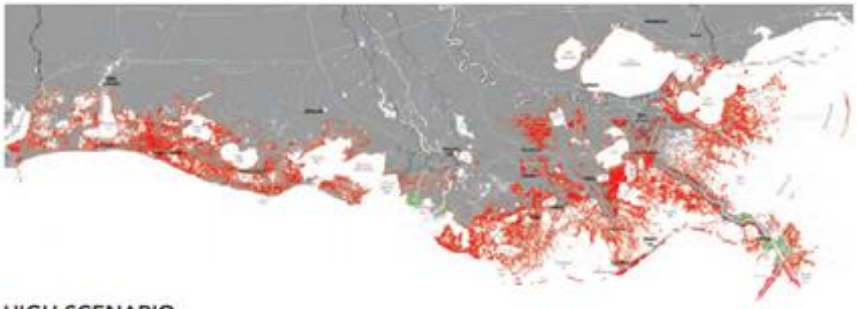
COASTAL MASTER PLAN

PROJECTED LAND CHANGE AND RISK

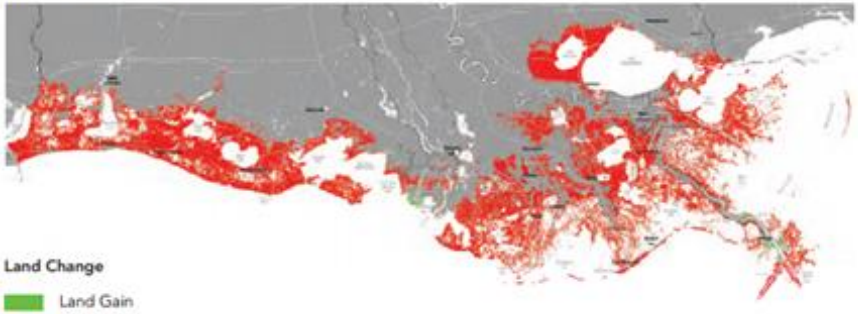
LOW SCENARIO



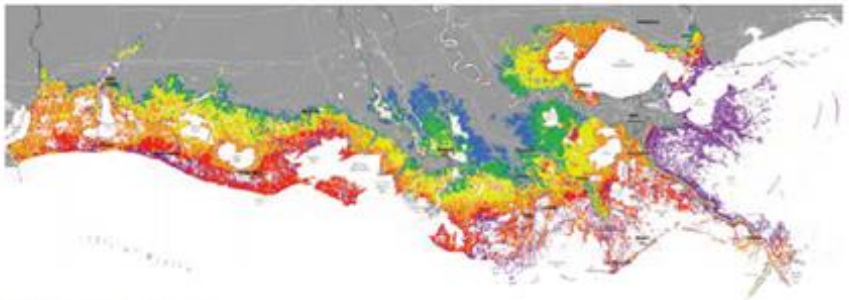
MEDIUM SCENARIO



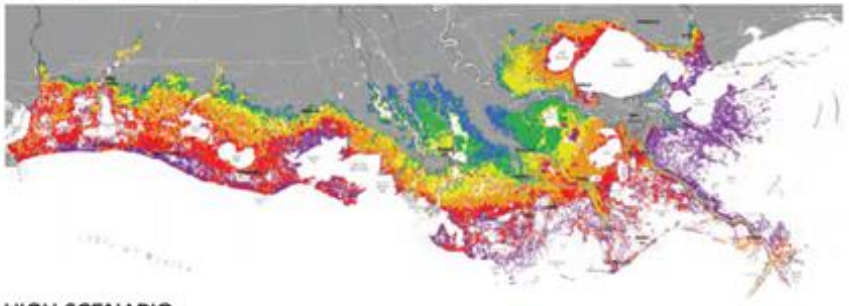
HIGH SCENARIO



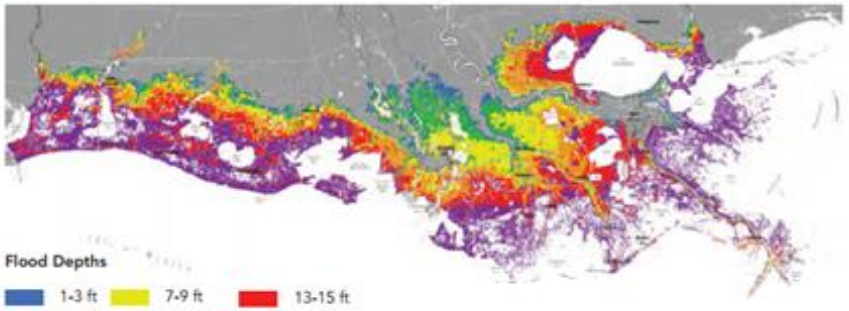
LOW SCENARIO



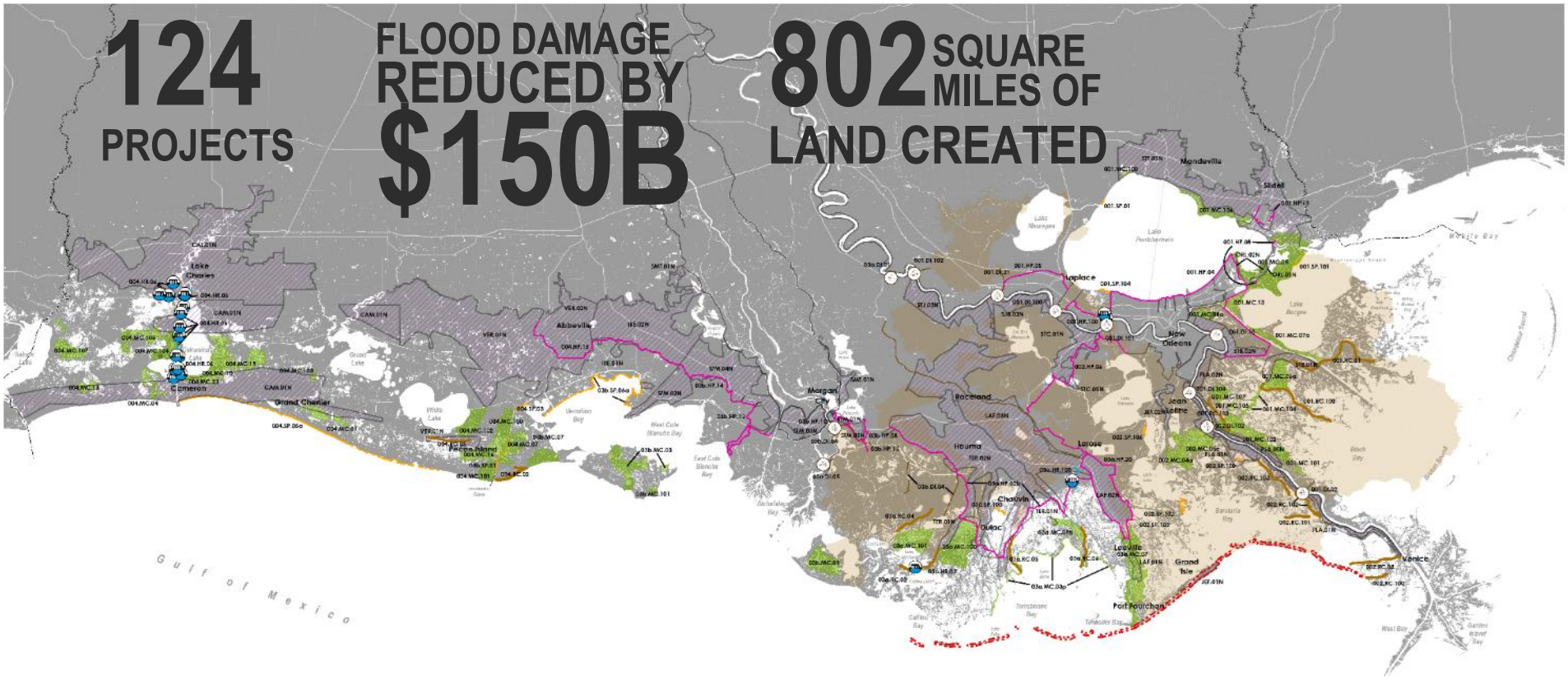
MEDIUM SCENARIO



HIGH SCENARIO



2017 COASTAL MASTER PLAN



PROJECT TYPES

Structural Protection | Nonstructural Risk Reduction | Ridge Restoration | Shoreline Protection | Barrier Island Restoration | Marsh Creation | Sediment Diversion | Hydrologic Restoration

Small scale hydrologic restoration and oyster reef/living shoreline projects are included programmatically in the 2017 Coastal Master Plan. Consistency of individual projects will be determined on a case-by-case basis.

N

0 5 10 20 Miles

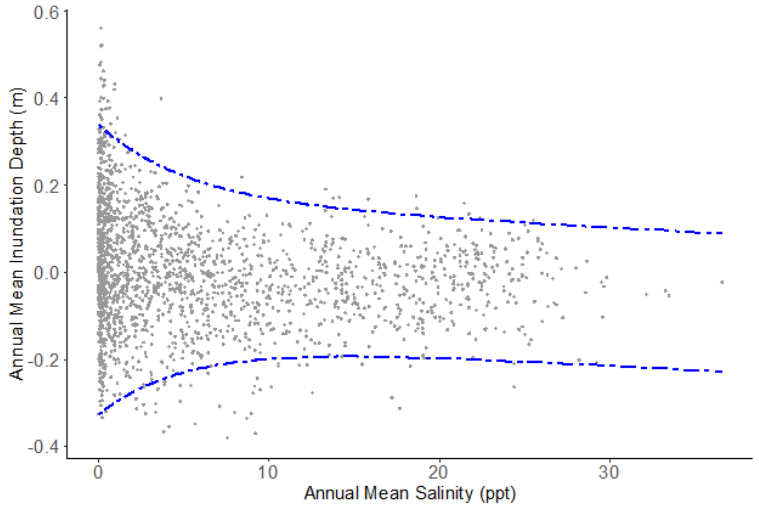
COASTAL PROTECTION AND RESTORATION AUTHORITY
CPRA

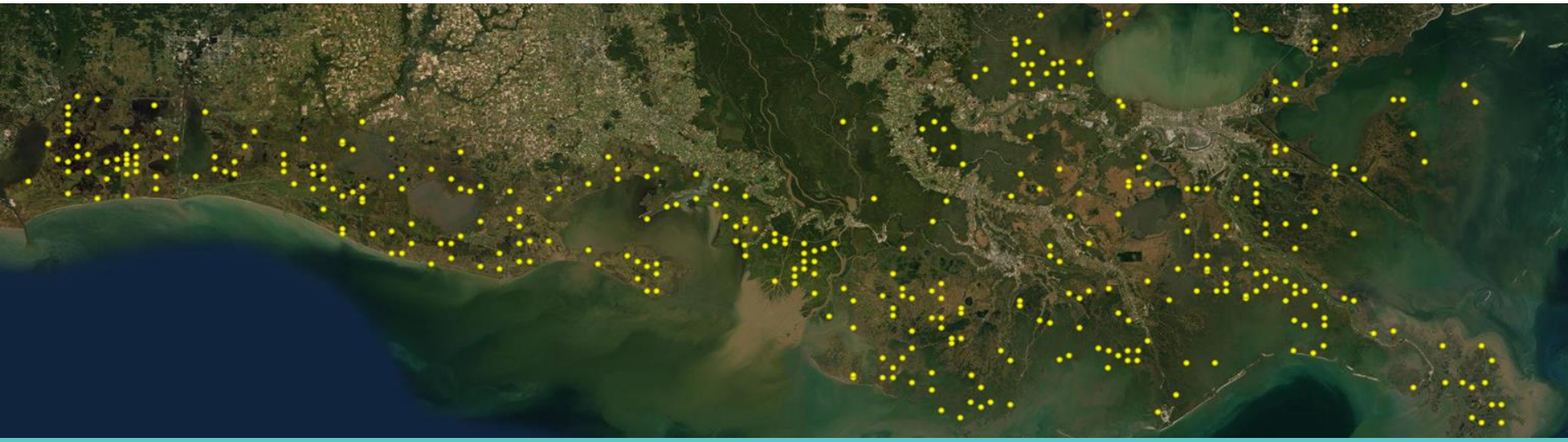
INCORPORATING NEW RESEARCH AND NEW DATA

INCORPORATING NEW RESEARCH AND DATA

CRMS Dataset

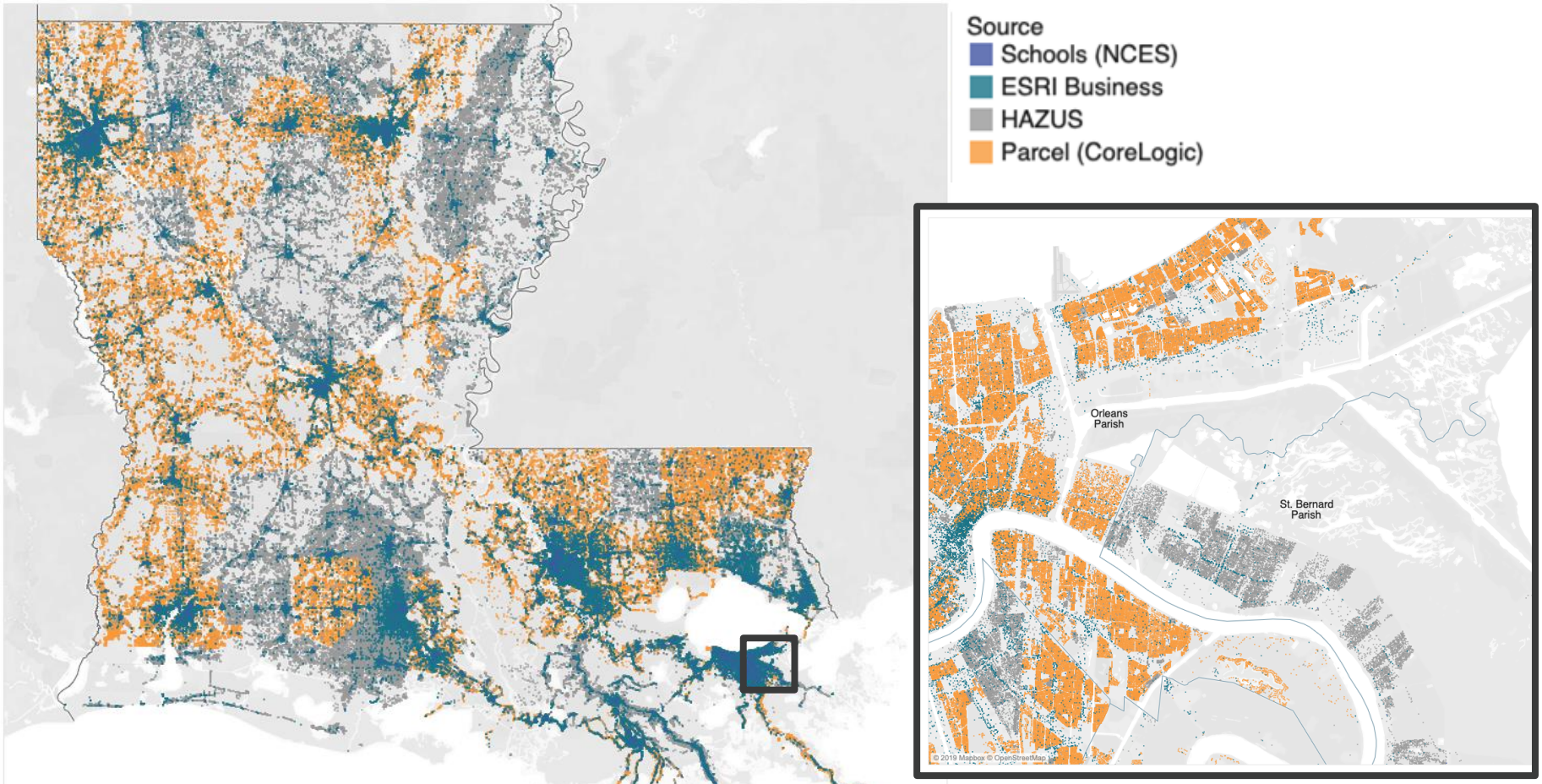
- Hydrology
- Wetland processes (e.g., elevation change, vegetation, organic matter production, accretion)
- Robust time series for calibration and validation



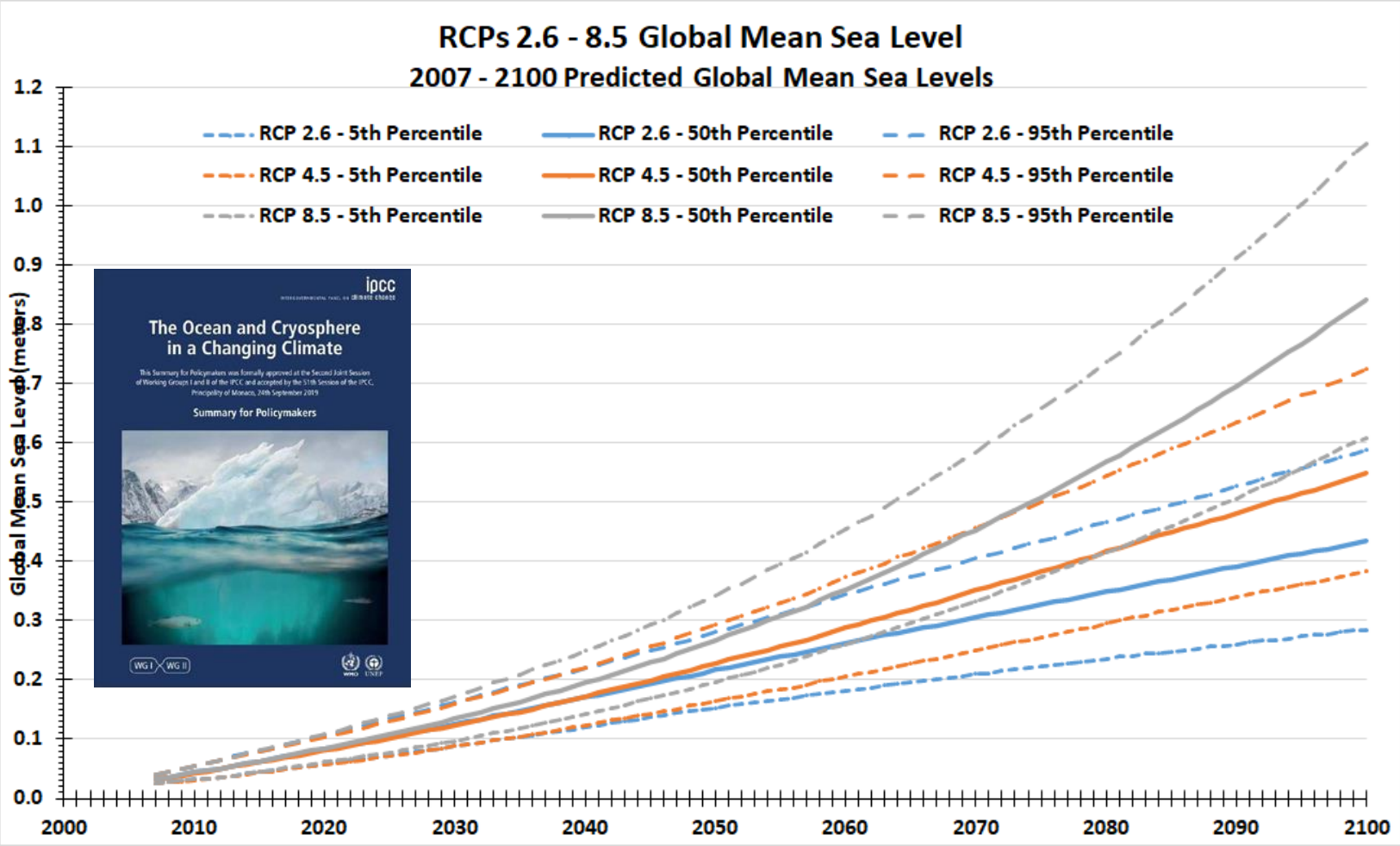


CLARA MODEL ASSET INVENTORY

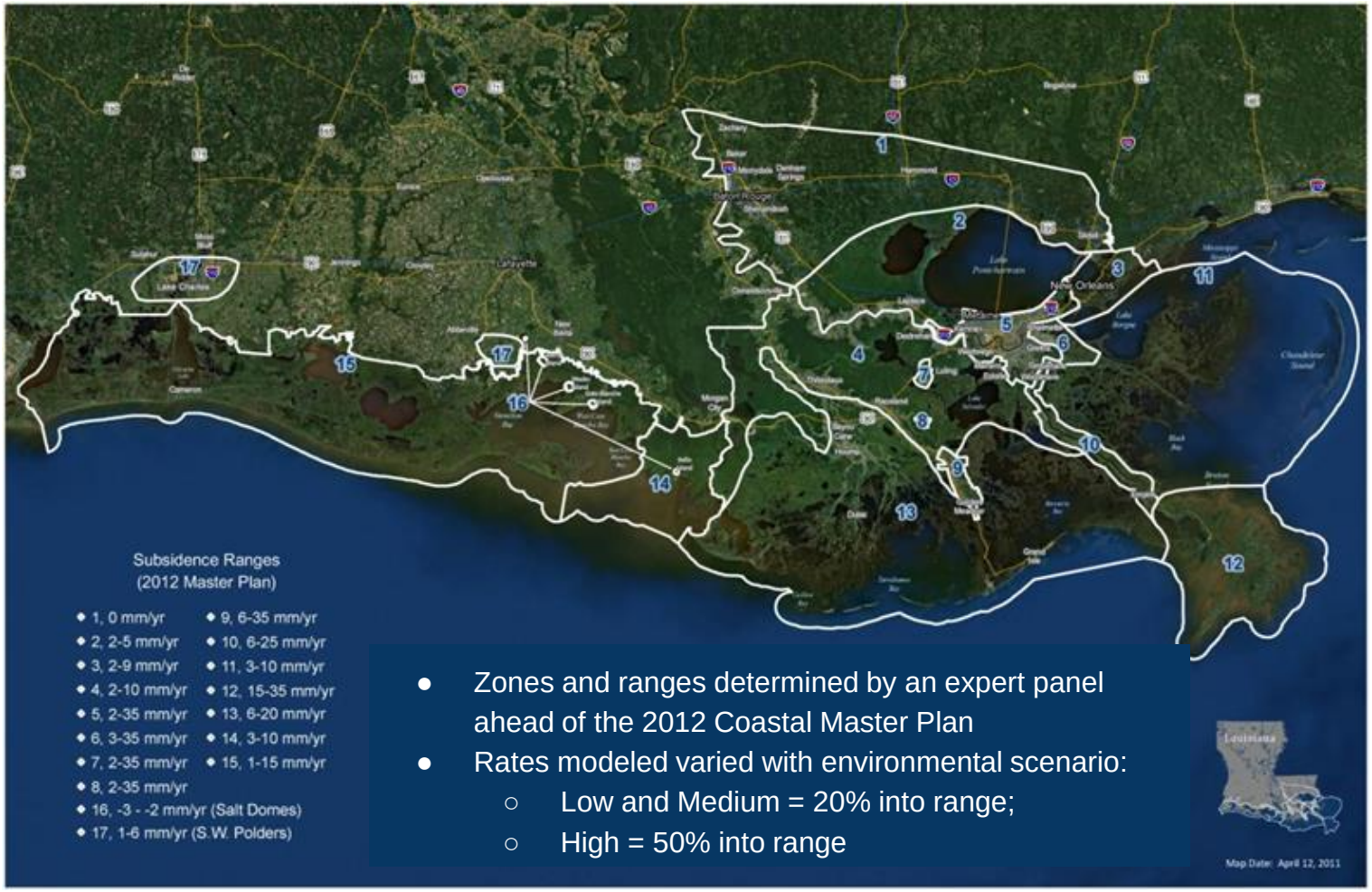
EXAMPLE OF NSI COVERAGE BY DATA SOURCE



SEA LEVEL RISE
PROJECTIONS FROM SROCC

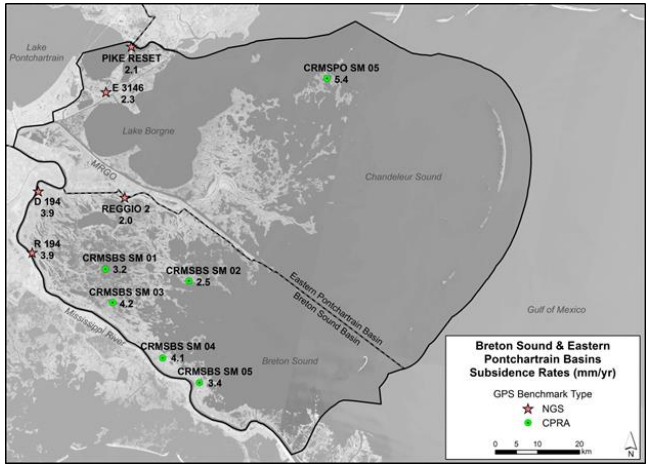


SUBSIDENCE
2017 APPROACH

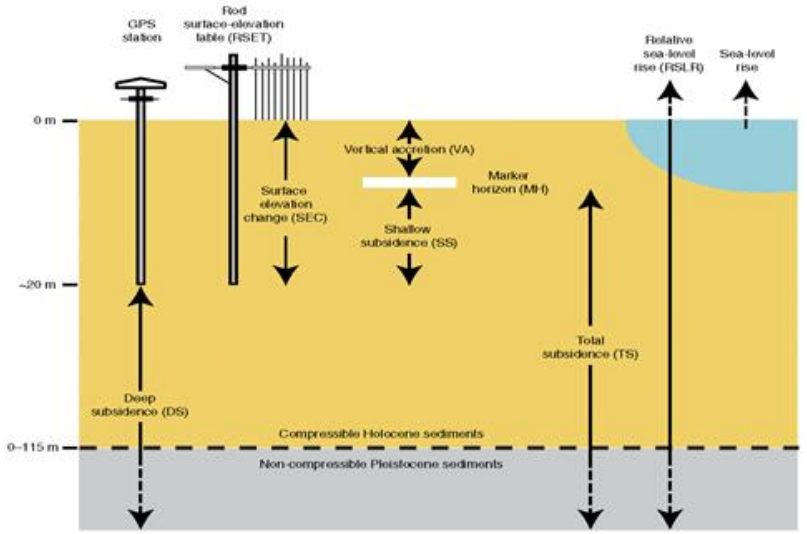


- Zones and ranges determined by an expert panel ahead of the 2012 Coastal Master Plan
- Rates modeled varied with environmental scenario:
  - Low and Medium = 20% into range;
  - High = 50% into range

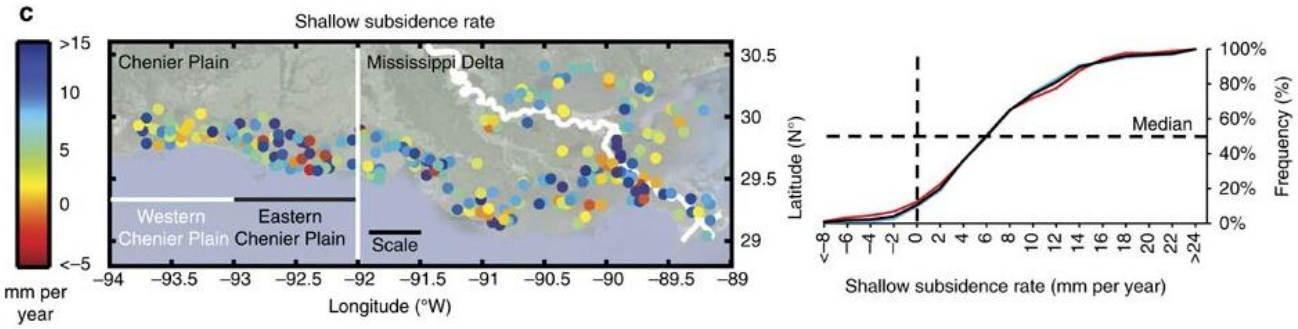
SUBSIDENCE
NEW RESEARCH



Byrnes et al. (2019)



Jankowski et al. (2017)



Jankowski et al. (2017)

Notable recent literature:
Frederick et al. (2019)
Jones et al. (2016)
Yeager et al. (2012)
Shen et al. (2017)
Jafari et al. (2018)
Jafari. et al. (2019)
Karegar et al. (2015)
Jankowski et al. (2017)
Byrnes et al. (2019)
Byrnes et al. (2015)
Cahoon (2020)

NEW RESEARCH

Törnqvist et al. paper

SCIENCE ADVANCES | RESEARCH ARTICLE

OCEANOGRAPHY

Tipping points of Mississippi Delta marshes due to accelerated sea-level rise

Torbjörn E. Törnqvist[1]*, Krista L. Jankowski[1†], Yong-Xiang Li[1,2], Juan L. González[1,3]

Coastal marshes are threatened by relative sea-level (RSL) rise, yet recent studies predict marsh survival even under the high rates of RSL rise expected later in this century. However, because these studies are mostly based on short-term records, uncertainty persists about the longer-term vulnerability of coastal marshes. We present an 8500-year-long marsh record from the Mississippi Delta, showing that at rates of RSL rise exceeding 6 to 9 mm year^{-1}, marsh conversion into open water occurs in about 50 years. At rates of RSL rise exceeding ~3 mm year^{-1}, marsh drowning occurs within a few centuries. Because present-day rates of global sea-level rise already surpass this rate, submergence of the remaining ~15,000 km^2 of marshland in coastal Louisiana is probably inevitable. RSL-driven tipping points for marsh drowning vary geographically, and those for the Mississippi Delta may be lower than elsewhere. Nevertheless, our findings highlight the need for consideration of longer time windows in

'We're screwed': The only question is how quickly Louisiana wetlands will vanish, study says

BY MARK SCHLEIFSTEIN | STAFF WRITER MA

Climate and Environment

Loss of Louisiana marshes that protect New Orleans is 'probably inevitable,' study finds

The research, based on 8,500 years of wetland history, says sea level is already rising too fast for marshes to catch up

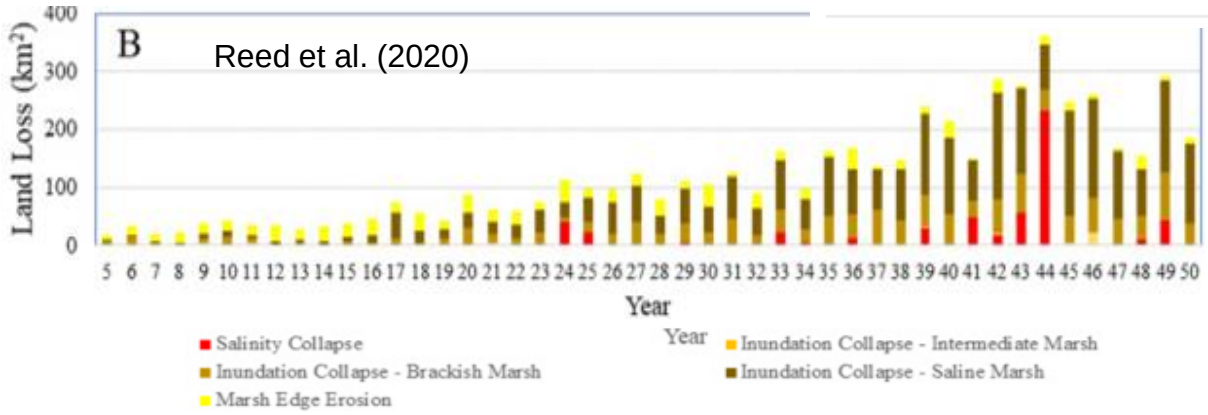
NEW RESEARCH
Törnqvist et al. paper

- Scientists have long suggested that there are probably tipping points for marshes in the face of rapid rates of sea level rise.
- This paper is a new way of attempting to define those tipping points by looking at the geologic record rather than modeling based on observed, short-term wetland processes.

2017 Master Plan

Cumulative Loss over 50 years	Low scenario		Medium scenario		High scenario	
	km²	%	km²	%	km²	%
Salinity Collapse	214.5	7.1	552.0	10.0	726.5	7.3
Inundation Collapse - Intermediate Marsh	41.7	1.4	64.5	1.2	121.1	1.2
Inundation Collapse - Brackish Marsh	599.6	20.0	1287.0	23.3	4001.2	40.1
Inundation Collapse - Saline Marsh	1289.6	42.9	2754.8	50.0	4269.5	42.8
Marsh Edge Erosion	859.1	28.6	856.6	15.5	867.9	8.7
Total	3004.5		5514.8		9986.2	

Reed et al. (2020)



Reed et al. (2020)

NEW RESEARCH
Törnqvist et al. paper

- Assumes no action on restoration or greenhouse gas reduction
- Diversions are an opportunity to provide additional sediment to a starved landscape that can build up marshes and mitigate the impacts of rising sea levels. **“[sediment diversions] can fight off worst-case scenarios and buy time”**
- Addressing climate change (reducing greenhouse gas emissions) makes us less likely to pass the more severe tipping point identified in the paper (7.5mm/year). This has been made a priority Gov. Edwards’ second term with the establishment of the Climate Initiatives Task Force.

The state of Louisiana is not letting its wetlands just disappear. It is planning vast “sediment diversions,” in which large flows from the Mississippi River would be redirected to use its remaining sediment to build additional wetlands in strategic locations. This can fight off worst-case scenarios and buy time, Törnqvist said.

Washington Post 5/22/2020

QUESTIONS?

coastal.la.gov